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ABSTRACT

Based on 17 case studies in European Community countries and a literature review, this research project derives several findings--some of them contradictory--about the evolution of qualifications related to office technology. The population studied was office technology users below the executive level. The project found that the impact of the new information technologies (NITs) is dependent on the following factors: technical characteristics and possible applications, the economic context that produces the objectives or expected results, the organizational set-up, and finally, an important factor, the methods of human resource management and the behavior of the individual and professional groups concerned. The research is organized in three chapters. The first chapter shows how technology, applications, the context, and the occupational categories have evolved since the 1960s, and how the daily experience of NITs has brought about new concepts of information and changes in patterns of behavior and roles. The second chapter shows how occupational activity has had to redefine its content and cope with a rearrangement of jobs, especially jobs in the banking, insurance, and secretarial sectors. The options offered by the present are highlighted in the last chapter. A 177-item bibliography arranged by country is included. (KC)

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New information technologies and office employment — European comparisons

European Centre for the Development of Vocational Training

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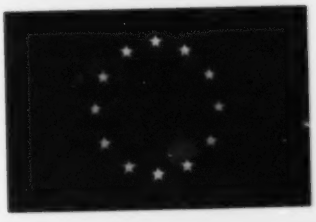

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New information technologies and office employment
— European comparisons

Nicole Mandon
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FOREWORD

In the course of its work on "Equal opportunities and vocational training" CEDEFOP has, in the last few years, commissioned several studies examining the impact on vocational training of the introduction of the new technologies into office activities.

In five Member States the personnel policy of large companies in the tertiary sector was analysed, the trade unions and male and female employees were interviewed. The companies selected were firms which were attempting to manage their human resources with an eye on future manpower requirements while ensuring the advancement of all categories of staff.

CEDEFOP's objective was to compile and compare the findings of these seventeen case studies, five of which were located in France; it also decided to entrust this work to the Centre for Studies and Research on Qualifications (Centre d'etudes et de recherches sur les qualifications - CEREQ).

We would like to thank CEREQ which is publishing this important synthesis document in French at its own cost. CEDEFOP will be responsible for publication in four other languages of the European Community.

"Office automation" has not come to the end of its development. In a period of numerous new advances, this study attempts to take stock, pinpoint key factors and plan a personnel policy which will give due consideration to all interests. It is addressed first and foremost to decision makers and practitioners in firms, but it will also be useful to all those who bear the responsibility for training in this field.

Maria PIERRET
Project Coordinator
CEDEFOP

This report is based on seventeen case studies commissioned by CEDEFOP and on a survey of bibliographies and documents provided by the research centres which were contacted in the Member States of the EEC. We would like to take this opportunity of thanking all correspondents and researchers who, by sending us the necessary material, enabled us to collect the basic data indispensable for our work.

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SUMMARY

On the basis of seventeen case studies commissioned by CEDEFOP in various EEC Member States, and a large bibliography of collected documents, the author has derived several findings - some of them contradictory - on the evolution of qualifications related to office technology, a term which is understood along the lines of the definition given in the Official Journal of 17. January 1982: "Office automation is the aggregate of techniques and means used to automate office activities, in particular the processing and communication of the spoken word, the written word and the image".

The impact of the new information technologies (NITs) is dependent on the following factors: technical characteristics and possible applications, the economic context which produces the objectives or expected results, the organizational set up, and finally, an important factor, the methods of human resource management and the behaviour of the individual and the professional groups concerned.

The technical aspect cannot be isolated from the many change factors which play a role. The occupational categories concerned are many in number and very diverse. International comparisons are often beset by difficulties of method due in particular to the lack of common reference points in the countries in question.

The author presents a summary of the changes which occurred in office activities in the last few years in order to depict the present situation and its perspectives. The population studied covers the non-executive level of office technology users who work in offices, either because they belong to a specific sector (e.g. banks, insurance companies) or because they are part of an administrative function or an administrative logistic support structure (e.g. commercial administration, secretariat).

The first chapter shows how technology, applications, the context and the occupational categories have evolved since the 1960s; how the daily experience of the NITs has brought about new concepts of information, changes in patterns of behaviour and in individual, collective and institutional roles.

The second chapter shows how occupational activity has had to re-define its content and cope with a re-arrangement of jobs; statistical figures are given as indicators. Specific attention is paid to jobs in the banking, insurance and secretarial sectors. "New" jobs are outlined, e.g. jobs with the function of interface or pivots, jobs linked to the management of systems or to support structures.

Against this backdrop, the options offered by the present phase are highlighted in the last chapter. The author believes that the differences found are due not only to variations in the pace of evolution or in structural characteristics, but also to the differences in the areas of

choice, and that it is at the latter level that the future definition of jobs will occur.

The problem of training induced by the introduction of the NITs cannot be reduced to the application of a new tool; the objectives and the conditions of occupational activity as a whole have undergone a profound change and the essential investments required in the coming years involve the content of training, pedagogical factors, the rules governing the relationships between institutions, follow-up arrangements, stock-taking and diffusion.

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PREFACE

This report which was prepared for CEDEFOP is the continuation of a long study which first dealt with a comparison of training systems and then with the producers of qualifications for tertiary employment in the United Kingdom, France and the Federal Republic of Germany (H. Steedman), and later with an analysis of work evolution and the recruiting and training practices of employers (A. Dirrheimer, S. Gensior, M.P. Alcobendas Tirados, C. Lange and C. Gillot, S. Bevan and A. Rajan, R. Baraldi, L. La Malfa, D. Telmon).

Following a colloquium organized in Rome on 30-31 October 1986, it was decided that it would be useful to compile what is known today on the diffusion of office automation and its impact on employment, qualifications and training needs. In addition to the publications mentioned above, we have, in order to accomplish this task, consulted a large bibliography of studies carried out in the last few years in the Member States of the European Community, whether or not they were initiated by international bodies. (1).

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(1) We were successful in collecting studies from the following countries: United Kingdom, Federal Republic of Germany, France, the Netherlands; then followed Belgium, Italy, Spain, Sweden, Ireland. At the moment we do not have any reference data for the other countries (Greece, Portugal...).

Our objective is to glean from all these works as a whole an updated understanding of the phenomenon of office automation, i.e. an understanding of:

- the present diffusion of office equipment;

- its impact on employment and occupational activity, the direct impact and the effects resulting from a combination of different change factors.

We think it is particularly important to highlight:

- the strong trends to restructure qualifications;

- the jobs and occupations which a e in decline or are developing and those which are emerging;

- the new qualification needs and the action taken in the firms to meet them;

- the major training problems which arise.

We hope that this document will be a reference which will keep our attention on the alert and guide us to pertinent action in the course of the coming years.

GENERAL INTRODUCTION

The main difficulties encountered in preparing this report were the following:

1) A contradiction between the copious material collected and, in spite of this, the impossibility of covering the field exhaustively (unbalanced surveys in terms of countries, sectors and size of enterprises).

2) The lack of comparability of the results obtained, partly because the goals and the methods of the studies varied considerably depending on the objectives and the methods of the authors, and partly because - a more fundamental issue - the absence of indicators which are equivalent in the different countries gave rise to almost insurmountable problems of method. The system of work prevailing in a country at a given moment entails a complex relationship between:

   - the characteristics of the sector studied: the state of advancement of techniques and products, the scope and strength of the competitors, the specific social history ...

   - the societal characteristics or the traits peculiar to a country: the role of the State, the educational system, the general economy, the social relations ...

   - the specific characteristics of the enterprise: its economic strategy and position, its history, its methods of human resource management, its technical and organizational maturity ...

The sectors viewed globally are not necessarily comparable between one country and another; even the banking sector which is apparently homogenous and faced with international competition, reveals many differences from one country to another. For example, in France, payment by cheque continues to be important, in Germany the system of debiting and crediting individual accounts still prevails (O. Bertrand and T. Noyelle). In the same way it is difficult to compare the training systems; some fields are well demarcated and have a set of similar skills, for example, the basic training for a motor vehicle mechanic; in other fields there is more diversity and this is the case in training for the tertiary sector (H. Steedman).

3) An attempt is being made to depict a situation which is in full evolution, every study, every finding is dated, dated formally through the year, but also dated relatively in relation to the path followed by the sector or the firm under observation. And this is one of the most striking characteristics of all the collected works. They generally do not present stabilized situations but situations in a state of flux, a state of groping for the right solution. This finding had an impact on our concept of the report which was also limited by the available resources.

We suggest that in order to fulfil our objective, we should view the results we obtained against the background of their dynamic evolution, i.e. we should try to highlight the perspective. This means that by scanning the present and the

past, we will try to identify the essential elements which play a role in the definition of occupational activity, in the employment structure and the workforce which is emerging. But, does an attempt to forecast future developments not entail a discerning analysis of the past and the present (R. Petrella)?

Office automation may be regarded as a given moment or phase within a broader process of computerization or, to put it more precisely, the automation of office activities with the aid of electronic information processing (EIP). The term "office automation" was used at the end of the 1970s to describe the broad scope of the field of application, in other words, it potentially covered all individual posts without any distinction between the types of data processed (numbers, texts, graphics, images, sound), and this was done by associating data processing with data transmission techniques. (2)

Generally speaking, one may say that the speed at which these techniques spread, the procedures for their utilization and their targets differed according to the context concerned. Because, ever since the first large-scale offensive of computerization in the 1960s, the contexts within which these techniques developed, have been greatly varied and have influenced the procedures adopted. These

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(2) We shall, in the course of this study, often use the term "information technology" which in our view also includes office technology.

have in turn left their mark and each new situation is pre-shaped, it is part of an existing structure. At the same time, the present period is faced with its specific constraints but has its roots in situations and patterns of behaviour which are the heritage of the past.

These phases, as we shall see, are not mutually opposed or mutually exclusive, they seem to slide into one another, sometimes overlapping or with time lags in technical, organizational or social terms (see the Table presenting the three phases at the end of Section 1 of Chapter I).

The present phase appears to be a mixture of characteristics which already appeared in the past and characteristics which are typically new. We can give several explanations for this:

- the problems arising from these aspects are not immediately evident, they have to be exposed, analysed, interpreted;

- the pre-existing situation imposes compromise solutions;

- it is difficult to change modes of thought pervaded by principles which have prevailed for years. In particular we note the firmly established principle that a given technique calls for a better organization, and this organization is based on the principles of specialization, sequential breakdown of processes and centralization. Heller speaks of "technical imperialism".

We do not intend to give a complete description of each phase but to show the salient points, how they have influenced work, how they mark the present situation and how this is evolving. This will be the subject of Chapter I.

This part of the study highlighting the distinctive and dynamic aspects will lead in Chapter II to the evolution of occupational activity and an outline of the restructuring of employment.

The comparative dimension is maintained throughout the report by means of illustrations gleaned from different studies. We decided not to impute the differences we found to national variables or differences in the enterprises, but to underline the phenomena in which these differences are manifested, because we feel that these indicate the essential options for the period to come. The subject of training needs is dealt with in Chapter III and takes into account the vital choices to be made in work organization and human resource management techniques.

List of abbreviations used

CNC - computerized numerical control
EIP - electronic information processing
NIT - new information technology
SME - small and medium-sized enterprise

CHAPTER I

OFFICE AUTOMATION - ALREADY HISTORY?

Introduction

Till recently, the studies dealing with the impact of the new technologies on work, qualifications and training needs were often contradictory. They were based either on monographs which did not lend themselves to generalization and were not easily comparable with the aggregate of different cases, or on figures which were not always relevant because the underlying notions were no longer pertinent (e.g. the notion of productivity applied to administrative work).

The accumulation of numerous studies undertaken now make it possible to take stock and examine - as most authors have been doing - the history which already exists of the process of automating office activity. Placing the different phases in their context makes it possible to understand the variegated - often contradictory - results obtained in the course of the ten years; the recent results enable us to understand the trends and to draw up an outline of the probable forms of office activity in future years.

Section I

The different phases

The individual periods are characterized by the state of the art, the main areas of application and the context which is mainly responsible for defining the objectives of information technology. As a consequence, the modalities, the other factors accompanying change and the categories of staff involved also differ.

Most authors confront the recent phase with an earlier phase. We, like Alter, propose a division into three phases. Together with the results of our own work, this more differentiated distinction makes it easier to understand the present phase and its perspectives.

1. The first period, the 1960s and the early 1970s: centralized processing of mass data

Within a period of expansion, of increased business activity and, consequently, increased administrative and financial tasks, the main aim of information technology was to handle large amounts of data. The first major applications were the processing of accounts and the processing of figures in the banks.

The data processing was centralized, it involved masses of information. The information processing department was

isolated and had a rigid system of processing a mass of data sent by the other departments; they, in turn, got voluminous data sent back to them, data which was difficult to handle and sometimes, even difficult to read. Often, rigid upstream administrative procedures had to be introduced and new areas of Taylorism emerged (e.g. the pools of punch card operators and verifiers).

The separation of the information processing services from the users, the constraining method prescribed for the supply of data, the rigidity and the opacity of processing operations contributed, in a large measure, to the idea of technological determinism.

During this first phase dominated by a "technological logic", there was little investment in training and qualification; a large number of operators, "the semi-skilled workers of information processing" were trained on the job and this category developed to the detriment of typists and assistant accountants. Also, the informatics engineers were the only ones who had the necessary know-how to organize and supervise the system as a whole (Alter).

2. Second period, the 1970s: the spread of computerization, the appearance of word processors and micro-computers

In order to understand this period a distinction must be made between the processing of figures and word processing.

Applications multiplied in the field of processing of figures. Terminals developed which enabled not only the standard and centralized processing of mass data, but also direct access to certain types of data and the development of some local applications. However, local initiative only extended to the way in which the programmes were used, the programmes themselves continued to be conceived by central data processing services. Data capture was often undertaken by the services where the data was created. So there was a tendency to reduce the data capture pools and to have the data recording done by specialized staff in the different services.

Parallel to this, from 1975 onwards, the first typewriters with memories emerged on the market. Later on, they were called word processors when they took on a modular form with a monitor and a keyboard separate from the storage unit and the printer (round about 1979).

The micro-processors developed progressively. At the start they were only dedicated to the processing of figures but gradually more and more word processing programmes were developed for them.

Thus, in the course of the 1970s and parallel to the development of computer technology which extended its network by adding terminals, word processors (WPs) and micro-processors spread in a more or less anarchic fashion, providing hardware for individual posts and for local applications.

Also, archiving, transmission and reproduction operations were further mechanized or automated.

All this hardware developed along separate paths.

Globally, the objective was to spread throughout the firm high-performance central consultation and calculation facilities by means of tele-processing links. A better grasp of data made it possible to run the firm with a precise knowledge of operation and output. A sort of "culture of ratios" developed, a common interpretation code of the life of the services, a reference which ensured coherence in the definition of the objectives and the means.

The quest for higher productivity reached the secretarial jobs at the end of the 1970s (at the beginning of the 1980s higher productivity levels for executive staff had also become a goal).

Investment in training and qualification was centred on the immediate exploitation of tools and software by the users, and controlled by an "extended elite" made up of computer experts, representatives of work organization management and some experts for specialized applications.

In the meanwhile local managers progressively discovered the advantages of processed data, easily accessible, and became more demanding; the direct users discovered the possible types of utilization at their level of these new technologies (e.g. secretariat, N. Mandon, J. Rannou).

Seen as a whole, this period saw an improvement in the execution and production output of office jobs, micro-computers were being used more by the executives or the technicians as an aid for their daily work.

3. Third period, the 1980s: the integration of different forms of data processing and transmission techniques

The main technical innovations were:

- the development of multi-function jobs;

- the link between data processing and data transmission and it is from this moment onward that the term "new information technology" (NIT) entered the scene. To quote Linda Thompson:

> Major developments in the use of micro processor based technology have taken place. Many depend on the combination of computing and telecommunications now known, as Information Technology (IT) which can be used to acquire, process, transmit and present information in all its forms: audio, visual, text and graphics".

These innovations which emerged at the end of the 1970s spread in the course of the 1980s. In a general fashion miniaturisation and high-performance data processing continued to advance. At the beginning of the 1980s it became difficult to draw a line between word processors which could

also manage files and process figures and the micro-computers capable of doing word processing and endowed with high-quality printers. The fields of application began to cover what one could call the realm of intellectual thought (aid for diagnosis, expert systems on the horizon).

At present, in the second half of the decade, we find that the spread of hardware seems to have settled down to a steady pace in France, the enlargement of the market seems to be increasingly in the field of software (the reason for the strategies of the manufacturers).

At the same time, because the economic environment has become more insecure, fluctuating, demanding, and because techniques have made it possible, the objectives of computerization have changed. It is no longer a question of only producing faster at less cost, of guiding the firm on the basis of precise and updated knowledge of its operation and output, but also a question of promoting innovation (new products, new services) and making the organization more flexible and adaptable.

The process of change and the conduct of this process are two essential but revealing factors of this phase, but they also disclose other possible choices, completely different options.

Some authors who may be called optimists have developed a thesis that this new phase will necessarily lead to participative approaches, to a spread of responsibilities and

decision-making, to a general upgrading of qualifications. The world of work will then mobilize the intelligence and the initiative of each person.

According to this hypothesis, the NITs with their wide diffusion, will make it possible for many users to apply specific local applications, to have access to central memories, to consult large data banks, etc. For N. Alter the essential objective of computerization is to increase "organizational productivity" and in order to achieve this end, efficient handling of information is an essential factor. The quest for new information products is a permanent feature and can be undertaken by expert groups and by the users themselves.

This means that operators were given a growing initiative to exploit their capacity to suggest, to innovate. Organization became an experimental feature. The users at the base could set out their specific objectives, and the experts tried to support if not encourage such initiatives while ensuring that the overall system remained coherent; they detected and reinforced peripheral applications which they felt were most relevant.

In contrast to this, the authors continued to maintain a highly taylorized but revised view of the adopted organizational and procedural features (F. Rauner, S. Bevan and A. Rajan) or they presented contrasting cases stemming from one school or the other in a pedagogical manner in order to present a convincing new concept (Heller...).

The firms equipped themselves with up-to-date hardware and maintained centralized operation (R. Koch).

We were relatively optimistic at the start of the 1980s (N. Mandon, J. Rannou), but our views became more differentiated, as we shall see later; in the meanwhile we are presenting the contrasting cases which may still be observed not as arguments for a debate but as a "historical" review of what their meaning may be.

To sum up:

- the first phase may be viewed as the quest to have more efficient handling of mass production through automation and centralization; here, the organization of work was based on the sequential breakdown of processes;

- the second phase may be viewed as the quest for better management and a better balance between centralization and de-concentration;

- the third phase may be considered as a period where an attempt was made to find a balance between the development and maintenance of innovation potential on the one hand, and operation at the lowest cost on the other; this was reflected in the new forms of organization from which it is still difficult to identify a model, but from which some new principles which we will try to pinpoint, emerge.

This presentation in three well-defined phases may make it easier to understand the general development, but through its rigid approach it masks the overlapping which could exist at the same time and the same place. Above all, it masks time lags in development - e.g. some firms have advanced further, others are just starting (R. Koch) - and also gaps in the links between objectives, technical options, organizational choices and social behaviour.

Globally speaking, one may say that the first phase was characterized by centralized processing of mass data with the development of taylorized work islands. The second and the third phase did not always go hand in hand with a progressively de-concentrated organization, with a growing awareness and a complete integration of the direct users.

It appears that the third period should in particular be regarded as the period of quest for new rationalization principles, new management modes which will enable the firm to conduct its own change processes while controlling the balance between high performance and less costly social strata. The external market gains more importance through unemployment. The State is invoked to exercise its different functions as provider of training and regulator of social relationships and balances. Individuals have to enlarge the boundaries of their occupational strategy. The different actors on the scene have to explore new territory where qualification and training appear to be two fundamental issues in the shaping of the future society.

Attention is drawn to the synoptic tables on the following pages:

AUTOMATION OF OFFICE ACTIVITIES,
THE THREE PHASES COVERING THE INTRODUCTION OF INFORMATION TECHNOLOGY

- First phase : the 1960s
- Second phase : the 1970s
- Third phase : the 1980s

AUTOMATION OF OFFICE ACTIVITIES, FIRST PERIOD: THE 1960S

Context: Economic expansion, rise in the volume of processing
Objectives: Processing of mass data, productivity growths

Technical characteristics	Evolution and change in office activities organizational choice	Staff categories concerned
	Manage production of mass data through automation and centralization; work organization is based on the sequential breakdown of the process	
Centralized batch information processing	Main applications of information technology: processing of figures: - accounting - finance sector (banks)	Decrease of qualified staff at the first levels of a career path Example: assistant accountants typists
	Automatic processing closely follows manual procedures and processing: linear or autonomous chains	Or, this category is removed from its working environment and its career path
	Data capture and recording of data are re-grouped in specialized sections or jobs: data capture pools, data typists	Example: typists who are removed from the secretariat and re-grouped in pools
	Information processing is centralized, isolated	A shift to jobs requiring few skills where routine, repetitive tasks are performed; these are the auxiliary staff in the tertiary sector.
	Parallel to this, the techniques required for other office activity do not develop well. They are still mechanical or electro-mechanical (typing, reproduction, archiving, storing); transmission techniques continue to be traditional Taylorized islands develop in line with the industrial model: typing pools, file storage, telephone exchanges, etc.	Example: data recording operators

AUTOMATION OF OFFICE ACTIVITIES, SECOND PERIOD: THE 1970S

Context: Start of the 1975 crisis
Objectives: Close supervision and follow-up of activities (management control, ratios), quest for rationalization and higher productivity in tertiary activities (higher productivity of office employees and later of executive staff)

Technical characteristics	Evolution and change in office activities organizational choice	Staff categories concerned
	Quest for equilibrium between centralization and de-concentration	
Centralized information processing and/or Dispersed information processing (increase of terminals)	More attempts are made to see that one data capture section feeds data to a database which is linked to various enquiry access points and to different processing lines; there is a shift from autonomous processing systems to one information system	The informatics experts still control the overall concept and the software, even for local applications The users gradually get acquainted with information technology, they learn what "information" is, and how it can be used
	Data capture is put back in the departments where the data is created, it is undertaken either: - by semi-skilled staff trained for this purpose (visual display unit typists, registration typists), or - or by qualified clerks for whom data capture is combined with other broader occupational activities (e.g. counter clerk in a bank)	Disappearance or strong decline of data capture staff (problem of re-training non-qualified workers which include a high percentage of women) Changes in the work of the direct users
	Choices and a quest for equilibrium between: - heavy equipment, centralized and standardized processing - light equipment, local "personalized" processing	
At the same time the following develop and spread:	Introduction is often left to local initiative, various forms of use:	
- micro word processors	- where the principle of Taylorism is predominant, the machines are used like production machines (e.g. word processors in pools with performance standards, observed in insurance companies)	The operators apply new know-how to a repetitive activity
- transmission techniques (direct dialling on telephones)	- where work methods are traditional and do not change, the machine is little used, under-exploited	No progress
- file storage techniques	- where a maximum exploitation of this equipment is sought for local needs: - on the spontaneous initiative of direct users (operators, secretaries, administrative technicians equipped with a microphone, etc.) - or through arrangements which will encourage experiments, suggestions, innovations (working groups, stimulation)	When micro-computers and word processors are set up through local initiative, a de facto permissiveness or an encouraged permissiveness enables local users to explore and exploit the NITs, to develop their activity and their role.

AUTOMATION OF OFFICE ACTIVITIES, THIRD PERIOD: THE 1980S

Context: Acute and permanent economic crisis, saturated markets
Objectives: Cost reduction, new products and services, flexible organization, speed, quality, innovation

Technical characteristics	Evolution and shift in office activities organizational choice	Staff categories concerned
Possible integration of different fields: processing of figures, word processing, image, transmissions, storage, information system, networks, databases The diffusion of hardware proceeds at an even pace, development of software	Quest for an equilibrium between the maintenance of innovation potential and operation at the lowest cost A more or less comprehensive definition of information systems. As far as we can see and from the viewpoint of the users and their interdependence, one may distinguish the following basic systems which can be geographically wide-spread with integrating features: - processing of vast amounts of figures (e.g. banking operations, general and analytical accounting...); - commercial administration as a whole (e.g. the path followed by an order from the moment of reception to the final settling of the bill after going through all product phases including management of stocks); - logistic administration (e.g. secretariat with typing service, keeping appointments up to date, filing, electronic mail...); - databases. The structure of the firm, i.e. its organizational structure could be spread out geographically, also some activities may be sent out for execution: - see the experience with work at home or work sent out; - see the emergence of new sectors of activity such as providers of distant secretarial services (mail, appointments, manning the office) working for several small firms or for free-lance or self-employed persons, etc. (Remark: As soon as they appear, these forms of organization show that they also have their limitations	Expansion of the staff categories concerned, video display units multiply (the 2005 report forecasts one VDU for each person) The informatics engineers become the experts who supervise the coherence of the systems which are often the result of joint and negotiated demands made by the different user departments. In some cases an Information Processing Section is set up. During this phase of definition and implementation, there is close collaboration between the informatics experts, organizers, trainers and users. New jobs enabling a better exploitation of the NITs appear (e.g. job at the interface between technology and application, office coordinator, office supervisor) The participative measures called for in the 1970s stemmed from a social logic (motivation, humanist approach); the participative measures called for today originate from a technical and economic logic; the idea is to mobilize the people who, through their experience, possess additional information and persuade them to contribute their know-how The effects of the NITs vary depending on the previous place and role of the people responsible for organization, on the manner in which change is guided, on the fundamental principles of organization adopted, and on staff management techniques The re-definition of occupational activities is to a large extent, based on the distribution of access to the processing facilities, on the involvement of the person concerned in the change process, on the degree of expertise in the field of information technology and the area of application, and on the ability to establish human relations and communicate with others

Section II

Degree of diffusion in the Member States of the European Community - the affected population

The term "office automation" stands for the provision of computerized aid at the level of the individual job, and we will accept the following official definition:

> "Office automation is the aggregate of techniques and means used to automate office activities, in particular the processing and communication of the spoken word, the written word and the image" (1).

Office automation is a part of the general process of information processing, it is not equivalent to centralized processing of mass data and is specific because of its field of application, namely, office activities. Thus, it primarily deals with sectors which have evolved during the present phase: the development of banking and insurance services, and also the development of commercial functions and management in all firms. It covers the fields where the rate of female employment is particularly high.

Can one expect the keyboard/monitor to be the basic workplace of each employee in the near future?

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(1) Official Journal of 17 January 1982.

According to the hypotheses laid down during the preparation of the report drawn up for the "Forecast 2005" Plan in France, there will be one equipped workplace for one office employee in the year 1995, whereas there is one for eight employees today (furthermore, in 2005 this job will have a processing output which is 100,000 times higher than what it was in 1985).

There is no doubt that information processing hardware has spread rapidly in the course of the last few years. However, recent market studies showed a deceleration in the number of machines sold on the market, the pace had reached cruising speed; in contrast, the software has multiplied. Indeed, up to now, it appears that the spread of the equipment has not been as swift as the forecasts predicted (R. Koch, U. Grunwald). Various explanations can be given for this: the costs, the inadequacy of the proposed solutions (still to be found), plus the anticipation of new features which are unceasingly proclaimed, and a social and organizational maturity which does not suffice to assimilate and exploit these techniques more effectively.

R. Koch distinguishes three methods to assess the diffusion of the NITs:

- on the basis of the turnover of the manufacturing firms (this marks a very large progression);

- on the basis of the total number of machines in the companies (the firms which have been equipped for a long

time with information processing hardware are renewing their machines; the number of firms which are starting to buy this hardware is rising but not as fast as could be assumed from the number of machines sold);

- on the basis of the rate of working population equipped with this hardware; this is growing, but for R. Koch it is more an evolution than a revolution.

However this may be, we find that there is a sizable number of machines and also an affected population which is becoming more and more difficult to identify.

1. A remarkably large number of installed machines

It may be assumed that the office automation phenomenon has come to stay in the countries of the EEC.

1.1. Rapid progress but below the market hypotheses

After a slow start - the first typewriters endowed with a memory appeared in France in 1964, but one had to wait till 1977 before the majority of all typewriters were not mechanical -, the increase in the number of office machines accelerated from the end of the 1960s to the beginning of the 1970s.

Examples:

- In Spain, at the end of 1976, the total number of computers of all sizes amounted to 9,970, at the end of 1984 it reached 83,000 (M.P. Alcobendas Tirado);

- In the Netherlands the number of firms with computers was 30,000 in 1982, and 67,000 in 1984 (Knapper and M. Alley); in the region of the Hague where office activities are most wide-spread, the number of office workers as compared to all occupied jobs was 44% in 1982, 45% in 1984, and 45% is forecast for 1990. The percentage of persons equipped with a screen was 18% in 1982, 41% in 1984, and 60-70% is forecast for 1990;

- In Denmark there was a spectacular boost at the beginning of the 1980s, the number of word processors rose by more than 800% between 1981 and 1983 (950 units in 1981 and 8,000 in 1983) (Social Europe - Office Automation Supplement 1985);

- In the Federal Republic of Germany the most recent findings are without doubt those obtained through a large-scale survey conducted by the BIBB and the IAB on the users of "programmable tools" (computers, word processors, electronic cashing machines, CNC machines, automated workplaces in industries with process engineering, etc.) (Richard Koch). Let us quote a few figures: about 21% of the workers use these technologies (21.1% of the men and 19.7% of the women), this means an increase of 7% as

compared to 1979 (+8.2% for men and +4.9% for women). These figures are distributed according to age, diploma and activity as shown in the following table:

Categories	Percentage of working population in 1985/86	Difference to 1979
Age		
Up to 29 years	21.2	+ 4.8
30 to 44 years	23.7	+ 9.7
45 years and over	16.9	+ 6.1
Diploma/Certificate		
No diploma	9.0	+ 0.2
Apprenticeship and vocational school	21.5	+ 7.1
Technician and technical school	30.2	+ 13.4
University	34.3	+ 15.0
Level of qualification (for employees)		
with few qualifications	16.8	---
with qualifications	43.1	+ 18.5
Executive staff	46.3	+ 18.3

These user groups are to be found in industry (26.2%), commerce (19.3%), public administration and others (23.3%), and also in large firms with a total staff of 500 and more (32.9%) and in medium-sized firms with 50 to 499 workers (23.9%); 14.8% work in small enterprises with less than 50 workers.

In this study the categories used to distinguish the fields of occupational activity are very large and it is difficult to identify their size. The highest rates are to be found among:

- qualified employees in banks and insurance companies, and other qualified employees in the commercial administration of tourism, transport, advertising, etc.; utilization rate: 28.2%, a difference of +9.4% to 1979;

- engineers, technicians and technical assistants; utilization rate: 45.7%, a difference of +21.3% to 1979;

- a very large group of employees responsible for work organization, administration and office work; this includes the jobs of managers, high-level executives in the public, private and self-employed sectors, jobs in accounting and book-keeping, computer specialists, typists, stenographers, administrative and qualified office clerks, and finally, auxiliary office staff; utilization rate: 42.4%, a difference of +20.1% to 1979;

1.2. The most highly equipped sectors

These are, in general, the financial sectors, industry, and in particular, the sectors with a sound economic situation such as the energy sector and, more recently, commerce and distribution. Public administration may, depending on the country and the field, be particularly well equipped.

Some examples:

SPAIN: Sectors with more than 10% of the overall value of the total number of computers installed:

	1976 %	1984 %
- Industries	28.5	16.5
- Financial services	28.3	25.0
- Public administration	15.6	(9.6)
- Distribution, sales	(7.9)	16.2
- Public services	(3.3)	11.2

(Figures given by M.P. ALCOBENDAS TIRADO)

Italy: The Italian banks own more than 30% (in terms of value) of the computers installed in Italy. They also have some 300 telematic networks, 70,000 terminals (as against

17,000 in 1977), and one electronic workplace for every 2 employees, these are the figures for 1983 (R. Baraldi, L. La Malfa, D. Telmon).

1.3. The case of the small and medium-sized enterprises (SMEs)

The studies, and in particular, the monographs very often deal with the large firms, and one may say that sociology, the social economy and labour psychology are, in general, marked by the model of the large firm; but, the SMEs represent 95% of all firms in the EEC and account for 50% of industrial employment (futuribles, October 1986).

From the early 1980s it was found that in the majority of the countries, the small and medium enterprises were introducing office automation systems at a faster pace than the large firms, with the exception of Italy (Social Europe, - Office Automation Supplement 1985).

In France (270,000 SMEs with 5 to 200 workers), a recent survey conducted by UFB Locabail showed a regular progression in the computerization of the SMEs: in 1984 four out of ten firms were computerized, in 1985 46%, which corresponds to the purchase of 56,000 micro-computers and 12,000 mini-computers; 32% of the firms with 5 to 9 employees were equipped with computers.

1.4. Territorial differences

According to the FAST report "Europe 1995 - Mutations technologiques et enjeux sociaux", there are major differences between the Member States in terms of NIT production capacities, NIT rates of diffusion, and institutional means and infrastructure which will enable the acceleration or control of diffusion. This report was written in 1983; are the arguments advanced then still valid? It was said that Greece, Portugal and Spain have industrial sectors which are, a priori, scarcely susceptible to innovation (a large number of small firms), productive structures which operate on a small scale and with a closed circuit, an industrial specialization which is oriented towards "traditional" sectors already highly automated such as textiles and ready-made garments. However, one can now see that the NITs can also pervade small isolated units, including family units, and coordinate them (example: the Prato region in Italy with family enterprises dedicated to textiles and ready-made garments, example of agriculture in France).

On the other hand, the argument linking the different levels of investment in training to the disparities will probably play a role not only in the implementation of the NITs but also more broadly, in dealing with new economic data. Investment in training and especially in initial training is a long-term proposition, and the FAST report recalls the high rates of functional illiteracy in countries like Greece and Portugal, and also the disparities in the heart of other countries (Italy, France, United Kingdom).

2. The affected jobs

2.1. Tertiary office occupations, some figures

At first, the groups involved in tertiary office occupations seem to be directly concerned. Two characteristics must be kept in mind in order to understand the effects of office automation and the human resource management techniques which accompany them:

- this group which has experienced powerful growth with the general expansion of the tertiary sector and the growth of the economy, has been subject to a noticeable deceleration since the beginning of the 1980s;

- female employment is expanding, but to the benefit, it seems, of jobs with less favourable status conditions (recruitment to the public service without civil servant status) (Bref No. 15, July-August 1985), jobs with a fixed-period contract, part-time work, etc. (L. Moens).

Some figures:

Federal Republic of Germany

More than 27% of the labour force works in offices. More than half the staff in offices and administrations are women. (Troll 1982-84).

Spain

In the last quarter of 1980, the working population in Spain amounted to 12,860,000 persons, the percentage of women was 29.1% (a non-uniform rate among the regions). This rate was lower than the European average. In the second quarter of 1979 the rate of female employment was 38.6% in the EEC, in Spain it was 26.5% at that time. In 1980 the services sector absorbed 55.8% of the female working population (19.7% in industry, 15.9% in agriculture).

Belgium

The higher participation of women in the labour force is a significant sociological phenomenon which particularly affects tertiary employment and, within this, the clerks more than the executives; for example, in a bank, the BBL, women account for one-third of the staff but only 9% of the executive staff. The recent evolution of women's employment should be related the development of new status conditions such as part-time work, temporary work, the increase of fixed-period contracts (in the banks, large distribution firms, public administration). The lower grade jobs are mainly affected by these status conditions, but more qualified functions are also beginning to be affected, for example, advice of a financial nature obtained after an appointment with a part-time specialist (L. Moens, L'emploi tertiaire face à la bureautique).

France

From 1960 to 1984 the number of tertiary jobs in offices more than doubled. However, this growth rate has slowed down moving from 4% per annum in the early 1970s to less than 2% in the early 1980s. The most recent data for 1982-85 shows a general decline in the situation of employment: an accelerated decline of the working population, a slight decline in employees (only non-worker jobs in design and middle management continued to grow). On the whole, over four years a net loss of 293,000 jobs was recorded. Men and women below 25 continued to be the most hard hit. Women's employment continued to grow at a slower rate.

In 1982 the large nebulous area of office jobs and services included 6,890,000 persons and this figure was even over 7 million if the "vaguely designated jobs" which are often office employment, are included (Bref No. 1-9/20 March-June 1986).

Between 1972 and 1983 the percentage of women in the working population rose from 37.6% to 41.8%. Some jobs were almost exclusively the domain of women (secretarial jobs). Some other fields where the share of female employees was high were the following:

- jobs in banks and insurance companies 52%
- jobs in public administration 66%
- jobs in accounting 59%

(based on the 1975 population census)

The employment offered to women was not equivalent to the employment offered to men. For example, it was found that in 1980-81 there was an increase in the non-civil servant status employment offered to women in the public services (Bref No. 15, July-August 1975)

2.2. No clear-cut distinction between office jobs and jobs in other sectors

Generally speaking, one may say that the information processing content of occupational activity, the diffusion of information processing tools and, in many cases, the inclusion of these tools (and thus of the workplace) in an information and communication network, tends to make one question the traditional distinction between office jobs and production jobs. Linda Thomson also underlines this obliteration of the borderline between the office and other sectors (stocks, manufacture, distribution). She points out that the number of people working on information rather than on physical objects is rapidly increasing and puts this at almost half the total number - "Information workers now total nearly half the working population of the UK."

Indeed, it is a fact that, from this angle, it is becoming more difficult to classify the jobs which act as pivots between the administrative services and the manufacturing or production services, e.g. jobs in production management (planning, follow-up, etc.) or operational jobs in the services sectors (planning and management of transport, hotel or tourist reservations, etc.).

Those jobs whose activities are mainly technical, physical or manual, are also being changed (or extended) through the addition of computerized data collection or administrative tasks (data collection on activities in workshops, on the movement of stocks, etc.).

One may present the following hypothesis: the development of information processing activities can promote mobility between jobs which, up to now, moved along separate pathways. This hypothesis is particularly interesting in the present context where firms are looking for new means of encouraging mobility. It is being envisaged, for instance, by a firm which is aware of the changes in the work of the store administrators and is examining the possibility of giving them access to administrative jobs (N. Mandon, current research).

2.3. Our frame of analysis

As can be seen, the assessment of the impact of office automation is not an easy task today, partly because it is difficult to isolate the technical factor from the numerous change factors which intervene, and it seems as if the options in terms of the organization and management of human resources are becoming increasingly distinctive determinants in firms (and even in countries), and partly because the spectrum of categories of the staff involved is very broad and it is difficult to study one category of employment detached from the others. There has been a veritable redefinition and re-location of jobs in terms of their relations to one another.

With this in mind, the study which follows should be viewed as a description of the shift in office activities which characterized the major periods of computerization. We will concentrate on the most recent period, while being aware that its roots are to be found in the preceding years. Today one may observe the coexistence of large areas still pervaded by the classical spirit of centralization, of hierarchical organization, of water-tight separation of functions - even if much equipment has recently been installed - and of islands where there is a quest through experiment - or through daily routine - for new organizational principles or new human resource management techniques. Even if no clearly formalized model can yet be identified, some basic principles are emerging and they have been confirmed sufficiently in several places (even in several countries?) to justify their being taken into serious consideration. However, this consideration should include a differentiation which is attentive to the diversity of the paths offered so that one does not prematurely concentrate on one path only, even if it appears tempting in social terms.

With respect to the studied groups the report proposes to concentrate on non-executive user jobs in office and information technology, involving office activities in the traditional sense, either because they belong to a specific sector (e.g. banks and insurance companies), or because they are part of an administrative function or give administrative logistic support (e.g. commercial administration, secretariat).

NEW INFORMATION TECHNOLOGIES AND OFFICE EMPLOYMENT

- EUROPEAN COMPARISONS -

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Conclusion
The expansion of the categories concerned
From operator to actor

The first chapter describes the progressive diffusion of information technology and the development of applications, and suggests that the staff categories concerned have also become progressively enlarged and diversified, a feature which is reflected in the studies undertaken.

The first studies concentrated on the "auxiliary staff in the tertiary sector", those working in the data recording pools, in the telephone exchanges, etc. and put the accent on working conditions (the 1960s).

In the course of the 1970s the interest of the researchers shifted to specialized jobs in the administrative, accounting and marketing departments, and towards specialized jobs in the highly computerized banking and insurance sectors. Then, with the spread of word processing (which started around 1976-77), secretarial jobs were examined.

During the second phase the accent was put on the evolution of qualifications and the options for work organization (concept of the socio-technical system). Several assumptions - with little substantiation - on the size of staff were forwarded. The ergonomists continued to study working conditions and developed an analysis of the learning process and the forms under which it appears.

More recently, in the 1980s, the authors have begun to get a more global understanding of the re-organization of the whole structure which accompanies the introduction of information technology and office automation, an understanding of how this change process which seems to have such a decisive effect on the long-term results can be guided. The technical factor is associated with a series of change factors used by the firms to cope with existing constraints. The occupational categories studied are enlarged to cover "all the actors" whose respective functions are defined; there is a re-definition and re-positioning of the jobs in relation to one another. All these topics will be dealt with in Chapter II.

The evolution of qualifications and training needs continue to be two central questions. Qualification and training are turning out to be the key issues of economic development and social evolution (Europrospective colloquium 1987). This subject will be developed in Chapter III.

ANNEX TO CHAPTER I

ANNEX TO CHAPTER I

THE EMPLOYMENT OF WOMEN AND FEMALE UNEMPLOYMENT IN THE COUNTRIES OF THE EEC

This paragraph has been taken from futuribles, March 1987

The employment of women

The under-employment of women in the countries of the European Economic Community, although certainly less preoccupying than that of youth, merits examination for several reasons:

- the female labour force is twice that of youth;
- the unemployment rate of working women in Europe, comparable to that of men in 1973 (2.3% and 2.5% respectively) has increased noticeably within ten years (10.7% and 7.7% respectively in 1983).

The main reasons for this relative deterioration in the employment of women could be deduced from an opinion survey carried out at the beginning of 1984 on a population of about 5,000 European women:

- the discriminatory attitude of employers, quoted mainly in the Federal Republic of Germany and Italy;
- a more favourable system of unemployment benefits, especially in Belgium, Ireland and Greece;
- the decline of industries employing mainly female labour, especially in Italy;
- and generally speaking, the insufficiency of vocational training, with a resulting decline in the professional qualifications required for female jobs, a decline which has become more accentuated in the course of the restructuring of the productive apparatus. Men mostly benefit from the measures to re-train and adapt workers to the new technologies.

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Disparities in the rate of female employment in the EEC countries

As there is no homogeneity between the different countries in their unemployment statistics we will refrain from comparing the absolute levels which range from a simple figure (in Germany) to double its rate (in Belgium), e.g., 7.5% and 17.8% respectively. What seems to be more significant is the relative gap of +28% which is to be found between the average employment rates for women and men, a percentage which amounts to +17% if female unemployment is compared to the total rate.

A clear distinction between two groups of countries may be seen from the following:

- on the one hand, the countries in the North of Europe where the situation on the labour market shows the least contrast in terms of sex;

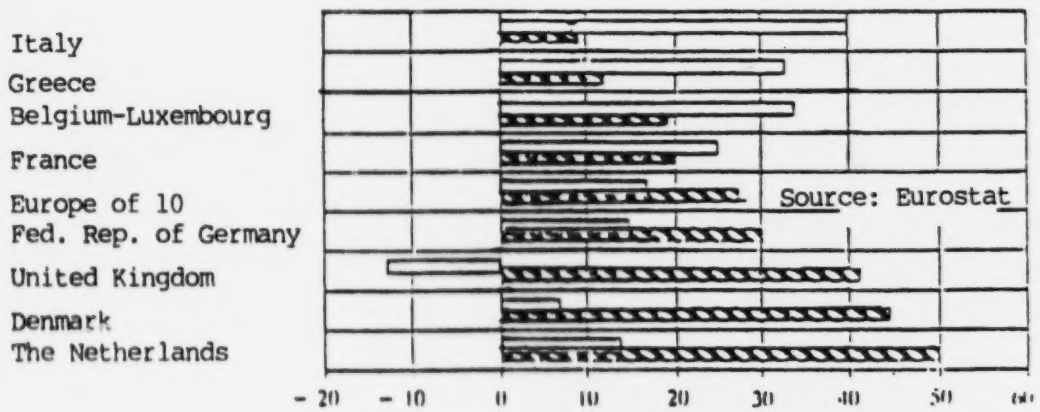
- on the other, the Southern countries of Europe where female unemployment may be considered a chronic evil.

Paradoxically, it would be futile to try and find the reasons for this in the rates of female activity (higher in the north with 38% than in the south with 33%) or in the level of education and training (more or less the same percentages for women with secondary education).

A more convincing reason for the North-South gap seems to be firstly, its close relation to the predominance of tertiary activities (58.1% in the North as against 54.9% in the South) in which, on a European average, 70% of the female labour force is engaged with a significant proportion of protected public jobs, and secondly, a higher rate of part-time work undertaken by 37% of the working women in the North as against only 16% in the South. The European average here is 28% (as compared to a mere 3% for men).

Source: CPE Bulletin,
No. 34,
January 1987

Female unemployment (difference in % to total unemployment)
Part-time work (in % of total female employment)



Female part-time work

Difference between female unemployment and total unemployment

CHAPTER II

CHANGES IN OCCUPATIONAL ACTIVITY

INTRODUCTION

The new technologies have one remarkable feature, they considerably change the scale of time and space. In the case of information, everything can happen within real time, distance is of no consequence. Up to now, administrative work was strongly marked by the necessity to move documents (information carriers) and by the time required for the different processing or calculation procedures.

This technology leap appears at a difficult economic period where strict management procedures are required, the markets are saturated and commercial strategy is mainly based on renewal, on innovation and on the quality of goods and services.

Consequently, the objectives of exploiting the NITs are the following:

- automate processing operations as far as possible, replace physical movements of information by real time transmission, in other words, change the processes and the procedures;

- offer new products and new services to the clients, this particularly applies to banks and insurance companies;

- develop new modes of administration and logistic support to the firm by means of:

- informational products geared to each service or even to certain persons according to their function or their responsibilities,

- precise and updated data enabling the control and the follow-up of management,

- relations and communication networks making it possible to have flows of internal and external information necessary for all functions and for decision-making.

These essential characteristics of the new technologies and the objectives of their exploitation have a direct influence on occupational activity as it is developing at present.

Complete fields of activity are disappearing, especially those relating to text production, the traditional circulation of documents and procedural paths. Other activities which existed earlier will also not remain the same, because the manner of execution has changed profoundly and because they have been merged to create new areas of activity under the form of direct responsibility or collaboration.

These basic statements must, however, be qualified by the differences observed. The studies carried out in the EEC Member States show varied options for the organization and management of manpower, and these options intervene greatly in the re-definition of jobs. It is difficult to impute these options to societal characteristics rather than corporate policy, but we will see that these are options

with far-reaching long term repercussions on the restructuring of skills and they have to be examined with method and with an eye on the future by all parties concerned.

Section I

The evolution of employment structures
Statistical findings

The statistical figures only give partial information on the changes taking place. The authors often found that the designations were the conventional ones and did not reflect the actual activity. However, the figures give an overall picture and quite clearly reflect the recession, the feminization, the reduction of less-qualified jobs.

Taking a look at the accumulated figures and the qualitative data, one may say that the hypothesis of the bi-polarization of qualifications proclaimed in the 1970s did not prove to be true. On the contrary, there was a profound change in the skills required for execution, even an uplift of the required levels, but we will remain cautious on this last point, because a context characterized by unemployment encourages the inflation of requirements at the recruitment level. We will attach more importance to an analysis of the evolution of activities rather than the requirements mentioned at the time of recruitment.

On the other hand, a strong segmentation of jobs can be introduced through the status conditions and management practices applied to the different categories. We will tackle this subject in more depth in the following chapter.

Here, we will present some general findings:

- a deceleration in the growth of the tertiary office sector in the course of the last few years, even a net loss of jobs. However, all occupational categories do not follow the same patterns of behaviour;

- the feminization of office staff continues to increase, but in terms of low status jobs;

- in addition to the customary distinction between skilled and non-skilled workers, the status distinction becomes increasingly important and is linked to whether or not the person belongs to an internal career path (see in the Annex the structure proposed by S. Bevan and A. Rajan);

- the statistics very clearly show the strong decline of less-qualified workers. It is admitted almost unanimously that jobs involving auxiliary or repetitive tasks are particularly vulnerable to the new technologies and the reorganization accompanying them. The context of crisis and unemployment accentuates this phenomenon which affects a large number of women. The rather low level of training makes the problem of adaptation even more acute (S. Gensior, G. Valenduc et. al.). In some cases, experience of this type of work has not made it possible to maintain a vocational qualification acquired at the beginning through school education and training (the case of the office clerk with a CAP affected by punch card data

capture operations or the accounting clerk with a CAP who is confronted with highly specialized accounting procedures (N. Mandon, Bilan d'un contribution aux chantiers de l'Association Développement et Emploi 1985-1986).

However, if the typing pools for data capture had a tendency to dwindle after direct recording of data was introduced in the different departments, the auxiliary jobs did not, as a whole, disappear and the English study draws attention to this category of employment which corresponds in the banks to an area of activity which is not entirely automated (S. Bevan, A. Rajan). A distinction must be made, in these jobs, between those which will decline further because of automation, and those which will be affected by new forms of work organization based on the NITs. We know of no study which tackles the last point methodically. But perhaps it is still too early to undertake a survey of this phenomenon which will certainly become an important subject of research in the coming years.

Section II

Development of the activity of qualified employees

1. General trends

The qualified and specialized employees seem to be subject to an apparently contradictory series of changes in their activity.

Let us take the example of employees whose jobs are integrated in a computerized network and who use terminals to perform administrative tasks (commercial or accounting) or tasks inherent in a service sector (banks and insurance companies):

- Direct data capture on the screen may be considered "menu-guided typing" governed by fixed procedures and this is hardly an enriching job;

- the reduction of procedural processing operations, now done automatically, and the immediate feed-back of the processed data (real time access) enable an analysis of the existing situation and a shift of activity towards follow-up and diagnosis (management and associated staff) or towards counselling and sales (bank teller, financial advisor);

- the interdependence of the different work stations through the information processing system means that the operator has to have sufficient knowledge of the whole set-up so that he can detect any anomaly and react to it.

We would like to present a comment here which is inspired by an ongoing study whose preliminary results confirm the findings obtained in the secondary sector. In this connection Y. Lasfargue uses a French pun to speak of the shift from a "civilization of trial and tribulation (peine) to a civilization of mechanical breakdowns (panne)". In the same way, when we regard administrative jobs, we could speak of a "civilization of diagnosis". We are indeed surprised by the extent to which employees are able to read what appears on the screen and what, more often than not, does not correspond to what the employee expected. This is a situation which occurs every day. The employee must work out what has been done during previous stages at different work stations in order to diagnose what is happening at that moment and take appropriate action, either directly if he has access to the necessary procedures or by calling another employee who does.

This diagnostic ability seems to be a criterion for differentiation between jobs. Within a firm it separates the more qualified jobs from the less qualified jobs within the same occupational category. A higher level of efficiency in this area makes all the difference between executive jobs at

headquarters and administrative jobs in the local branch offices (1).

We will illustrate this by taking the example of jobs which are integrated in an information processing network and are equipped with terminals. In many other cases these work-places are equipped with independent machines (micro-computers, word processors). In general, and contrary to the views held in the 1970s, the informatics tool does not lead to a levelling of different occupational activities. It compels the employee to have a better understanding of the procedure in which he wants to intervene and to scrutinize it carefully, and it finally makes him more demanding vis-à-vis his own special area. Perhaps the expression "more professionality", so popular at the moment, is partly a manifestation of this.

The result is that the effects of the NITs gain significance only through an application in a particular occupational area in keeping with its roles and responsibilities, irrespective of whether this area is a sector or a firm.

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(1) These remarks are inspired by an ongoing study whose aim is to test and refine a method to analyse the work and skills relevant to the present context. The population chosen for this experiment covers all administrative occupations involved in the execution of one order starting with the recording of the order and ending with the settlement of the bill (N. Mandon, study to be published, CEREQ, 1988).

Thus, administrative activity in the transport sector is still marked by the problems arising from the organization of transport under the constraints of time and space (use of transport, storage), the necessity of applying specific administrative and regulatory procedures required for security reasons or prescribed by the police or due to fiscal or economic factors (administration of transport).

The evolution of the documentary function may be summarized as follows (according to D. Barrat):

> At the three levels of activity which may be distinguished - documentalist or information expert, documentation assistant, data typist - ... the new demands relate, inter alia, to stricter methods in information processing ... In the first two levels of activity it is less a question of compiling and creating a documentation than of knowing how to chose the relevant articles and documents, a difficult task which calls for professional expertise in this specific field and a sound comprehension of the expectations of the documentation seeker".

The impact of information technology on work has been studied in depth in the banking and insurance sectors which are characterized by the following specific features:

- they are privileged fields for information processing because of the data involved. Banks and insurance companies use the NITs both to improve their work

processes and to design and propose new products and services to their clients;

- The profession is traditionally organized as a closed circuit with lines of promotion starting at the bottom and moving up to the executive levels, and based on vocational training organized and managed by the sector itself.

2. The example of jobs in the banking sector

This sector was characterized by a strong expansion phase in the 1960s and the early 1970s in line with general upward trends in the economy. Belgian, French, German, British and Italian studies show that this first phase of expansion was marked by a major development of traditional banking activities. The larger numbers of staff required were obtained through massive recruitment of employees with medium qualifications including a large percentage of women. Information technology was mostly used to process large amounts of data centrally.

The present phase is characterized by a saturation of the traditional market (individual accounts), but the financial sector continues to grow at two levels:

- hectic activity on the stock exchanges which goes hand in hand with a world-wide economic crisis;

- important innovations leading to new products and services offered to the clientele (handling of accounts, individual insurance, etc.).

The NITs have enabled this shift in work, they are now used not only to process mass data but also to help specialists in their work as advisors to bank customers and to provide recurring services more rapidly in an environment marked by growing competition.

Banking activity, both in terms of decisions for major national or international transactions and local services, is founded on access to updated data, updated not only to the day but sometimes even to the hour. It is probably one of the sectors which, as a whole, is a major user of data transmission, databases and data banks.

The countries with a less developed economy or with a lag in their development obviously present a different context:

Italy	1 counter for	4,300 inhabitants
France	1 counter for	1,500 inhabitants
Germany	1 counter for	1,500 inhabitants
Switzerland	1 counter for	1,300 inhabitants
United Kingdom	1 counter for	1,200 to 1,300 inhabitants
(USA and Japan	1 counter for	1,200 to 1,300 inhabitants)

(Figures given by the representative of the Italian Banking Association during the Rome colloquium in October 1986).

The surveys carried out on the most advanced companies in these countries show relatively homogenous findings in terms of commercial orientation and application of the new technologies.

Seen on a global scale the number of employees in the banking sector is declining or is stagnant.

Generally speaking, the evolution of work organization in banking shows the following features:

- less back office typing

- an upsurge of commercial activity and counselling of the clients who are offered:

    - a broader range of products and services,

    - a closer geographical and physical approximity of banking services through a larger number of local branch offices and, increasingly, through the establishment of more automatic telling machines.

(The Spanish example corresponds to the findings in Italy and France in terms of products offered and organization. In contrast, the cases presented in the UK study show a different organization strategy. The accent is on a re-grouping of services in order to achieve an economy of scale).

This is manifested through a strong reduction of back office staff whose work does not require specialists and through an increase of staff working in counselling and the specialized services of the bank. Less deposit operations and more financial advice and counselling for sales, investment, and management of property or insurance (Belgium, Federal Republic of Germany, Spain, France, Italy, United Kingdom).

The job of counter clerk or teller is a popular target for innovation. Equipped with an interactive terminal he can effectuate current operations directly, get access to the status of the clients' accounts and take the necessary action. The client will soon have direct access to these routine operations and basic information through the automatic machines and this will lead to a new phase where the teller will concentrate even more on counselling and sales.

At the same time the jobs in the administrative services equipped with information processing systems are also developing.

3. The example of jobs in the insurance sector (2)

The jobs in the insurance sector are characterized by a number of rules and procedures which have to be grasped well. The professional hierarchy is determined by the degree

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(2) This rather precise illustration is influenced strongly by the French studies.

to which these rules and procedures have been mastered (claims clerks, assistant clerks); parallel to this, various preparatory tasks are carried out: mail, filing, typing.

The professional know-how is thus acquired by experience and on-the-job training, and access to jobs at the middle management level is acquired after having undergone training in the vocational schools run by the sector.

The expansion in the years 1960-1970 (augmentation of services offered to private clients: car insurance, third-party insurance, etc.) was accompanied by efforts to standardize a large number of simple products, a standardization which was conducive to computerization. This dual movement of standardization and computerization introduced a strong distinction and compartmentalization between clerks handling simple procedures and clerks dealing with complicated cases. In the latter case small islands of individual occupations continued to exist, e.g. accident insurance for industry where the traditional distribution of tasks through seniority made it possible to learn the trade. At the same time there was a move to organize pools of typists and data recording operators.

During the same period the recruitment policy was changed. Recruitment on the external market for employees with a higher level of education (baccalaureate, baccalaureate + 1, baccalaureate + 2 years of training) for the small islands of occupations, made it possible to retain the career path "employee - middle-level officer - executive", which placed

greater demands on training, while the other occupational categories were left outside this stream.

During the most recent period the trend, at least in France, seems to be to abandon a word organization based, on the one hand, on a sequential separation of work processes and, on the other hand, on the distinction between simple products obtained through standardized processes and complex products; instead, the trend seems to be towards a work organization based on the products required to follow a large-scale commercial objective which governs the whole set-up. The work organization should make it possible to respond rapidly to the client's needs, follow-up the product, cope with fluctuations on the market (stagnation of mass products, development of complex risks, e.g. entrepreneurial risks, and the development of personal insurance, e.g. retirement, old age pensions, savings, - all products where banks are direct competitors). Although the forms of organization examined here are many and still in a state of flux, one may say this is a phase of search, of experiment. The trend seems to be towards an organization in small units, capable of responding rapidly to developments on the market, to the needs of clients, the commercial aspect is predominant. Office automation is an indispensable support of such a configuration, not only because it enables data to be processed, but because it supplies the necessary information in real time.

This trend is the indication of a profound movement, and it permits the assumption that in the long term there will be a

major change in qualification requirements, in the re-definition of different occupational categories and in the shape of professional careers.

4. The secretariat (3)

Traditionally, the secretariat constitutes the physical foundation of information and communication for an office or an officer (it compiles, classifies and communicates). It ensures that someone is always present in the office even if the officers are absent (especially by giving information on the telephone). It is involved in preparing and organizing the activity of the office or the officer (preparation of the documents, planning, appointments, reservation of meeting rooms, reservation of tickets, etc.)

In the past some of the tasks were removed from the secretariat proper and re-grouped in special services (typing pools with or without their own sections for simple correspondence, mail services for registering incoming mail, distribution and dispatch. archives, etc.).

Secretarial jobs are directly affected by the NITs. Their evolution (directly followed in France since 1976) is confronted with the following situations:

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(3) This presentation has been inspired by the French studies. The examples found in the other countries do not, as a rule, examine this occupational category so systematically.

- the general tendency to reduce staff affects secretarial jobs;

- it is probable that the typing pools equipped with word processors and functioning as production centres for typed text with given output standards, will continue to exist. But we also saw pools whose roles have changed completely because of the NITs. Exploiting the technical possibilities they have gradually discovered, they now feel they are providing a service which can develop customized office applications if they are requested to do so. This particularly applies to the processing of files which the data typists in the pools create and use, including the necessary printing commands to facilitate reproduction later;

- the tendency is to give up the one-to-one form, i.e., one secretary for one executive, and to have one secretary for several persons;

- the secretarial activity corresponding to the traditional core of secretariat functions will remain, but its modes of execution will be transformed completely through the NITs. Generally, one person is responsible for one area (reduction of staff). So, in addition to knowing how to use the NITs for the different operations, the secretary must find the proper method and organization to manage a series of tasks, some of which are routine and some of which are urgent or priority tasks (typical aspect of secretarial work);

- some secretaries have become specialized in the field for which their specific section is responsible (personnel administration or sales administration, for example). The NITs and, in particular, file management techniques which are possible on word processors or micro-computers, have brought about this shift in their functions and has led to a classification at a higher level, i.e. the career differences between secretaries and administrative staff are diminishing;

- some secretaries have developed the processing of figures for the preparation of documents to follow up and monitor office activity. Here too, we found some cases where this new role was classified at a higher level and reduced the difference between secretaries and "management assistants";

The cases where the role of the secretariat was considerably enhanced had the benefit of favourable conditions:

- the persons involved were dynamic; they had explored and exploited the NITs, had detected possible applications and passed on the information to interested persons;

- a not-too-rigid definition at the start of the activity had enabled it to remain flexible;

- the management showed interest in the new possible applications proposed and suggested by the secretaries. Also, the attitude of the "clients" of the pools who accepted

close collaboration with the secretaries, supported the development of these services;

- finally, in certain cases, the "humanist" attitude of a manager led to an enrichment of the secretaries' jobs.

All the same, there are some limits to these developments:

- A lack of understanding of the importance of the basic work done by a secretariat led to a drastic reduction of staff, linked sometimes to the changes in activity mentioned above. The tasks executed traditionally by the secretariat now have to be done by the executive staff who, in turn, are faced with reduction of their numbers, which means that the individual workload has become heavier. The excessive reduction of the secretariat will probably lead to a re-awareness of its essential role (cf. the following remarks on work sent out to external agencies);

- the creation of specific jobs for the development and encouragement of NIT application can, in keeping with its concept, limit its implicit areas of experimentation (cf. following section);

- the pools and the secretariats were often the first departments to be equipped with word processors (and later micro-computers). They could thus benefit from a relative lead and could "ingest" the possibilities offered by these technologies. When the NITs are used on a broader scale a

number of applications will be undertaken directly by the client himself. Administrative officers will increasingly manage their own files. The managers too, will probably develop some applications for their direct needs.

Section III

New employment

Since the start of industrialization, the evolution of techniques and the growing complexity of the organization of enterprises were accompanied by an increase in the number of technical and organizational specialists. In recent years too, the economic environment and the diffusion of the NITs have led to the emergence of new functions and specialities. Here we will examine the new employment available for administrative and secretarial staff.

1. Jobs at the interface or link between technology and application

The role of these jobs is to ensure a close link between information technology and the needs in the application field. This link can take the form of direct and continuous collaboration between the information experts and the users, but jobs for this specific purpose are increasingly emerging. They can be occupied either by former information experts who have specialized in a particular field of application or by users who have acquired enough competence in information technology to be able to communicate and collaborate with the information processing professionals.

2. Jobs linked to the information system, its management and its functioning

Highly specialized technical jobs such as that of network manager are not normally accessible to the population under study in this report; on the other hand, we find jobs within a multi-station word processing system whose function is to manage the data carriers (disks) or joint files; for instance, the supervisor of a multi-station word processing system can set up and update a reference library which can be used by the different work stations.

In the case of an information processing system, one clerk can be given the task of managing the access.

To our knowledge, the employees who assume these new roles combine them with other activities. They continue to produce text, very often they have a support or stand-by function, they give help when necessary, or train others in the use of the equipment.

3. Jobs providing assistance and training for routine work

These are monitors, supervisors and coordinators for office technology, or there are some administrative staff members at headquarters who provide assistance and support for the local agencies (without, however, any change in their designation).

The people who do these jobs are generally former clerks in user services or former secretaries or administrative employees. These jobs have the task of disseminating new know-how and promoting the extended use of the NITs. They should not be confused with the job of trainer who gives training in pre-arranged courses outside the workplace.

There are two essential characteristics involved:

- the task here is to transmit non-stabilized developing know-how, because hardware and software are continually developing further, applications are being extended, because, in general, the NITs offer a range of options and are progressively leading to a permanent search for the best solutions;

- the learning - and the discovery - of the best solutions generally occurs in practical applications, in the course of the daily routine. So the persons in these jobs not only have to acquire their own know-how in order to pass it on, but they have to see that any advance made is spread as fast as possible. Their role is to stimulate. They are also requested to:

  - test new hardware or new applications,

  - identify practical difficulties and propose improvements (different types of forms, for instance).

Strangely enough, these new jobs have not been mentioned or only mentioned very fleetingly in the studies we examined, although their role is important. They are the vectors of change. However, two aspects may be observed:

- their role can be to encourage to the maximum positive and innovative attitudes in the different direct users - clerk, secretary, typist - through stimulatory action;

- their role can be to experiment, test and define applications and procedures at their level in order to teach them to be applied systematically.

It is obvious that the conception of this role, whether at the level of the enterprise or at the personal level of these pioneers who are practising it, will have a strong impact on the long term development of direct users.

Conclusion

A profound change in office employment

In concluding this chapter we may say that during the reference period of this study, i.e. the end of the 1970s and above all the early 1980s:

- the overall growth of office jobs slowed down and even tended to decline; the lower grade jobs were the ones most affected;

- as far as the non-qualified jobs are concerned, it is difficult to make a distinction between those who happen not to be hit by automation and those which have emerged from a new organization and new system of work;

- the qualitative development of qualified jobs is important in the context of shifting roles which make the traditional frontiers between areas of specialized activity and thus between career pathways lose their relevance. The activity of tellers in banks is moving towards sales aspects and counselling of the client; secretaries can be in charge of specialized administrative or commercial procedures or monitor activities in the office, this sometimes leads to a change in their classification; they become supervisory administrative staff or management assistants. Finally, the jobs of typists in pools are shifting towards customized file

creation and file management, together with other technical office activities which are then offered as a service;

- new jobs are emerging which play an essential role in the adaptation of information technology to needs in the field of application (interface), in the greatest possible use of the NITs and in the development and diffusion of the new know-how required (supervisors, data carrier managers, monitors, coordinators);

- incidentally, the role of the higher-level managers has also changed considerably. It is shifting towards support and leadership rather than supervision. Liberated from the constraints of supervising routine work and planning, they can devote more attention to developing their managerial capacities (WRU);

- mention must be made of the growing irrelevance of the frontiers between the activity of the firm and the activity of the client (automatic telling machines), between activity within the firm and activity by external agencies for the firm (work at home, recourse to external providers of services).

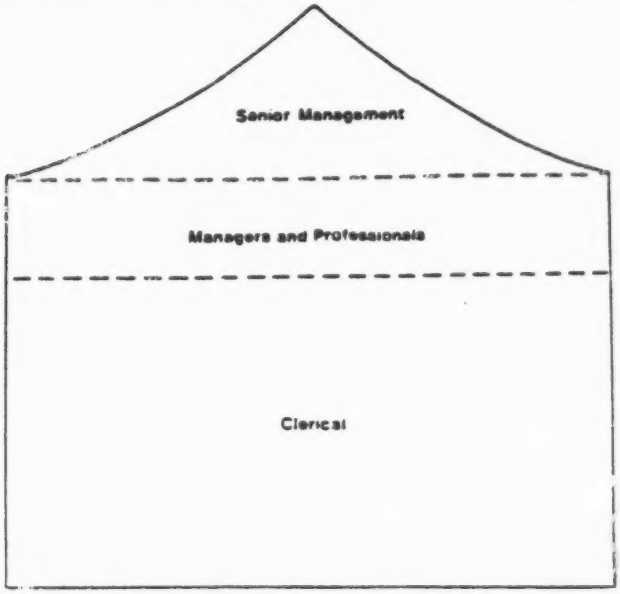
Can all the persons concerned adapt to these changes and under what conditions can they do so?

In this chapter we have outlined the most predominant trends on the basis of several different cases.

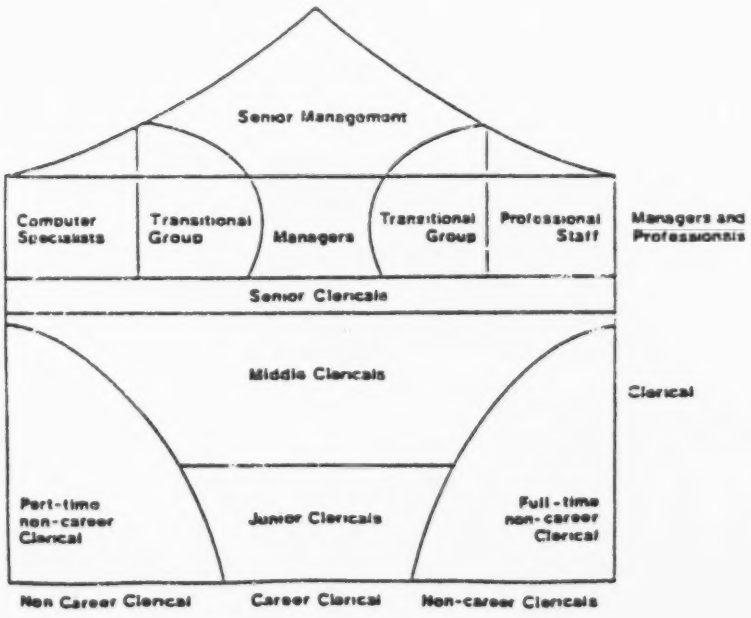
The objective of the next chapter is to underline the alternatives and options which seem to emerge from this diversity - options with regard to organization and options in terms of human resource management and, in particular, training practices.

ANNEX TO CHAPTER II

1 - Occupational Structure : An Overview



2 - Evolving Occupational Structure



Source : IMS Case Studies and Rajan (1987)

CHAPTER III

ORGANIZATIONAL OPTIONS AND THE PRACTICE OF HUMAN RESOURCE MANAGEMENT

DEFINING THE PROBLEM OF TRAINING

Introduction

In the last two chapters we tried to present the basic trends in order to help the reader to follow the developments of the last ten years. In this chapter we shall show the differences, the somewhat contradictory findings of the studies, by presenting the hypothesis that these differences not only show the varying paces of development, but also, and mainly, the alternatives and the possible options, and that it is at this level that the future segmentation of jobs will take place.

We, on our part, have found considerable differences which will probably have far-reaching repercussions on the future definition of jobs, on the choice of organization and on the practice of human resource management; the options in one or more fields will have a cumulative impact. We have summarized our findings in the following table:

Summary of organizational
and human resource management options

Organizational options	Options in human resource management
- centralization/decentralization:	- make use of existing staff or not
. decision . control . role of auxiliary activities . use of external agencies	- division of jobs into specific categories according to business activities and status
- diffusion of preoccupations:	- limit training schemes to adaptation or immediate promotion
. improvement of performance . consistent management . participative action . encourage innovation	- invest in the potential of the people

Section I
Organizational options

1. The centralization-decentralization option

Several factors support decentralization:

- the possibilities offered by the NITs to get direct access on the spot to processing capacities and databases;

- the need for precise and updated supervision and follow-up of management objectives;

- the trend towards marketing or provision of services adapted to local market conditions or even to the specific needs of a client.

The last two points in particular seem to justify the decentralization of a large number of decisions and possibilities of using information.

However, the situations observed in this connection are highly varied. Should one recall the resistance of the central departments and, in particular, the information processing sections which, traditionally, were given the sole right to select the hardware and software and to lay down the conditions for access to the information? Or draw attention to the philosophy of the firm, its culture or,

more basically, a combination of societal characteristics? How should one interpret the works of S. Bevan and A. Rajan whose conclusions differ greatly from the studies conducted in other countries (France, Italy) but have an affinity to the German studies?

If such a decentralized system is set up, it either leads to or is accompanied by different types of centralized controls or limitations to access:

- this control is not applied when the file is processed but at a later stage in the form of an audit or through global statistics (O. Bertrand, T. Noyelle, N. Mandon). For the qualified employees this means that:

  . in the first case, there is a precise and restrictive distribution of access keys to the facilities for recording, processing and changing data,

  . in the second case, there is a less restrictive distribution but a greater necessity to master this field well,

- through the experience gained in the last few years the firms now have a better appreciation of informational products and make a more precise distinction between the standard centralized data banks and the files required for local operations.

The quest for an equilibrium between centralization and decentralization has not ended yet. It commenced in the second phase (described in Chapter I) when the broader diffusion of information technology took place, and it is still continuing at present, bringing with it new economic and management constraints and new technical possibilities. A complete reversal of direction in some organizations is proof of this (see the example of the DVLC driving and vehicle licensing centre, studied by Heller, which changed from a centralized organization set up in the early 1970s on authoritarian principles - "the conceptual prison of technological imperialism" - to a decentralized organization with participative features in 1975/76).

2. The role of auxiliary activities or how far can work be restructured?

With the advent of a broadly diffused information technology and the possibility of undertaking data capture at the level of the users, the question of the place and the deployment of auxiliary activities arises once again. S. Gensior remarks that in practice the problem finds different solutions depending on the firm concerned: "in simplified terms one may say that the solution adopted consists either of separating the auxiliary activities which are not (yet) automated from the actual data processing itself and entrusting them to less qualified employees, or making the qualified employees do these auxiliary and routine tasks...". She stresses that, in the first case, the employees entrusted

with these auxiliary activities face a dead end as far as their professional prospects are concerned.

However, the incorporation of tasks considered to be auxiliary and low grade in the work of qualified employees is also not devoid of problems. O. Bertrand and T. Noyelle refer to the tension arising in a Swedish insurance company when the clerks dealing with simple claims - considered to be a higher qualified activity - were asked to deal with the fixing of simple premiums and to advise clients.

In the meanwhile the tendency in the banking and insurance sectors is to organize work, not on the basis of a sequential breakdown of work processes but on the basis of a commercial breakdown (type of client, type of service produced).

The authors mentioned above discern a tendency in the same direction with the apparent survival of the former organization in banks in the Federal Republic of Germany where the traditional division of work between the cashiers and the counter clerks has been maintained. "The banks are organized according to market segments. A specific group of clients is guided towards a specific group of counter clerks, each group has its own administrative support structure and cash counter, all of them built up on the same principle".

We find the same situation in manufacturing or commercial companies where administrative jobs are re-shuffled in order to give direct support to production or sales.

3. The spatial distribution of activity, external work, work at home

The combination of data transmission techniques with data processing techniques increases the possibility of a spatial organization of work. In theory, it permits work at home and the incorporation of work completed at distant locations, whether they belong to the firm or not. Independent suppliers of services are becoming more and more common in the secretarial sector.

We will not deal here with the important studies conducted within the FAST programme. Let us just say that the more experience we gain in this field, the more the limits become apparent. In particular it should be realized that the work undertaken by a team or a group of persons needs exchange if it is to be coherent- an exchange which cannot be reduced to data transmission through the NITs (cf. the experience of Rank Xerox in England, presented by Heller). The same study also underlines the important role of the secretariat which ensures that the communication network of a department is constantly manned.

We should also remember that these new technical possibilities certainly enable a geographical dispersion of work, but they also make it possible to incorporate a number of originally disparate and independent units in a network. This has been done in the Prato region in Italy where a number of small family textile enterprises are part of a management network geared to the international market, which

enables them to respond rapidly to orders. This example does not fall within the scope of our study, but we would like to mention it because it involves a problem of method which does concern us. In the light of these new possibilities for links between firms, how can a small enterprise now be defined?

4. Greater efforts to achieve better performance

In order to cope with economic constraints, restructuring, the instability of the market and technological innovations, the firm becomes more flexible, increases its innovative capacity and streamlines its management - all factors which can affect jobs depending on the options selected by the management.

These efforts can either take the form of regular and commented information on the results of the activity, or an appeal for initiative and creativity in the form of proposals or suggestions. Several techniques have been developed in the course of the last few years such as a quality task force, controlled and directed by the management, or pilot departments or enterprises reporting their experiments. Gradually it is becoming clear how change and the social patterns of change can be learnt.

The methods differ depending on:

- whether the change in question is a specific moment in the life of the firm (e.g. the introduction of a new technology, a radical restructuring of the organization) or whether, on the contrary, it is a part of the daily routine, a permanent quest for improvement;

- whether the change affects several categories of staff or is confined to working groups or project groups consisting of executive staff, senior clerks and experts.

Here the importance of the new jobs described in Chapter II, Section III becomes apparent.

The efforts to introduce participation which, by definition, covers a large range of staff categories, formally appeared in the 1970s as a remedy for demotivation and absenteeism. The forms and the objectives of these measures have continued to develop, but their purpose now is to make better use of the know-how and suggestions for improvement which each user or each employee can directly contribute at his level (Sainsaulieu, Child, Heller, WRU, Alter, Mandon).

The experience gained from such situations is equivalent to the learning of new attitudes and behaviour. Heller remarked that after such a participative re-organization, many employees re-defined their jobs and, as these had become more varied, they had higher expectations of future improvement of their work.

We would like to present the following hypothesis: this element of qualification, i.e. the capacity to innovate, to make one's own work more dynamic, runs the risk of becoming as much a discriminatory factor in the medium term as the separation of conception and execution was up to now; and this applies to all, relatively independent of their level. High level specialists in a narrow field could have an activity which is very well defined but becomes out of date, in this case their qualification would very soon become obsolete or useless. We hope that the anticipatory techniques of human resource management will take this problem into account by setting up flexible ad hoc training courses and career paths.

Section II

The practice of human resource management

The definition of the new requirements is quite homogenous in the different studies, however, there are considerable variations in the approaches to "produce" these qualifications and the occupational categories concerned.

1. The definition of new requirements

This definition has become progressively broader in the course of time. The importance attached in the 1970s to logic, to the capacity to think in abstract terms, has become relativized through the demands made on products, human relations and personal behaviour:

- S. Bevan and A. Rajan make a distinction between process skills and product skills. The ability to handle a video display unit and to diagnose problems leads to a combination of both categories and is based on the realization that a number of solutions have to be adapted to the problems posed;

- generally speaking, the accent is put on human relational skills. This reflects two aspects of the work situation which are assessed differently by the authors and the managers of the firms:

. relations with the client which involve listening to him, analyzing his needs, giving him advice or information on the products and services offered. This aspect is strongly emphasized in the comments made by the managers of the firms, especially those in the finance sector, and is a direct reflection of the weight they attach in their business strategy to product diversification and commercial initiative,

. relations associated with the complementarity of the jobs in the firm dealing with one product, one procedure or one service. These jobs generally involve different areas of activity and constitute a network for the individual employee, a network in which he must place his field of intervention and which sometimes is extended to cover suppliers or sub-contractors. This second aspect is underlined less often by the authors although it implies specific requirements which cannot be neglected, especially if they have to be included in training (N. Mandon, J. Rannou, D. Barrat).

- finally, demands on behaviour are stressed - initiative, creativity, are the terms frequently used. Very often entrepreneurial action is demanded of the employees in various occupational categories: more efficient management, innovation (cf. the French studies) or entrepreneurial skills (see the English study).

If we leave aside the debate on innate and acquired abilities, it becomes clear that these abilities, which are

often ascribed to the individual personality, must become the subject of training and transfer when they turn into fundamental requirements for a large number of workers.

The temptation is great to translate these occupational requirements into terms of general education and training. Analytical capabilities, communication skills, etc. are things most people seem to require. However, we would like to give a word of warning on this distinction between general education and vocational training. Occupational activity includes several dimensions which have to be identified in the manner of a kaleidoscope for the purpose of analysis, but in practice, all this is closely linked to precise professional problems. In our own studies we could see how closely the learning of the NITs is related to practice and application. Indeed, the NITs make it necessary to undertake a deeper analysis of the procedure, the process, the network in which one has to act, and therefore, increase the demands in the professional area, in the specialized field. A. Sorge and P.P. Valli have presented findings which point in the same direction.

2. The arduous reaction of the vocational training system

The new qualifications required by the NITs and the work organization can be provided by different means: the State through its educational system, the various public or private training institutions, the persons themselves can acquire these qualifications either individually or through

associations, the firms can provide them either on their own initiative or through professional associations.

According to many studies, the contribution of the school system is inadequate and full of gaps. There are many reasons for this; insufficient funds are often mentioned, but where they are available, they are inefficiently used. (Knapper et. al). The problem of providing training establishments with sufficient equipment certainly exists, but the issue is broader:

- the cumbersome structure of national educational systems makes it difficult to react to rapid changes which are occurring at increasingly shorter intervals;

- occupational activity has changed profoundly and is developing still further; trainees have to be prepared for jobs which are not yet properly known;

- the technologies now make it possible to automate increasingly complex know-how; they leave man with the more subtle tasks of analysis and diagnosis, tasks related to the living (human relations) and the future (innovations, improvement of existing systems). But these new dimensions imply a new definition of training content and new teaching methods which are as important as the content (S,Bevan, A. Rajan);

- at present - perhaps because of the inadequacy of pedagogical methods - the best way of acquiring the necessary

skills seems to be through the actual experience of concrete situations. The closer links now being established between teachers and firms makes it easier to keep up with the growing pace of change and to bring formal teaching and actual situations closer to one another.

The best solution appears to be a series of joint activities set up by the parties concerned within a more or less broad framework which could be territorial (regional or local), sectoral, at the level of the enterprise, etc.

This institutional aspect which is emerging is significant proof of the importance of vocational qualifications at the present moment. This issue was one of the main topics discussed at the "Europrospective" meeting held in Paris in April 1987. It is also to be found in numerous studies (Dutch, English, French). The statements presented at the beginning of the French meeting of the FAST programme "Enjeux europeens des changements technologiques" on 9-10 May 1987 in Paris included the following: "...the development of the modes of intervention of the public authorities...is necessarily linked to those of the other economic and social decision-makers. In particular, the arduous evolution of the educational system...makes us get a better understanding of the role of firms in training and acquisition of skills, as a complementary factor to Government policy..."

We do not intend to embark on an analysis of the reactions of school education systems studied elsewhere (H. Steedman)

or continuing training systems (F. Rauner). We will take a look at the actions of the firms against the background of the general context described above.

3. Action in the firms

In order to satisfy its new qualification needs, the firm can recruit new staff, either through the natural replenishment of staff generated by the age pyramid or the turnover, or by laying off workers; it can also make use of internal mobility and additional training. There are several arguments for the latter:

- use of the existing staff: this appears to be particularly necessary because in the preceding decades there was massive recruitment during an expansion phase and the age pyramid is especially broad at the 30-40 age-group. The present situation has led to a decrease of resignations and dismissals (applies to the banks in most European countries; in addition, they generally offer protected wages and status);

- in the case of new recruitment the general tendency is to raise the level of education (at least secondary education for clerks and - increasingly - University education for staff who are expected to rise to executive level) and to establish new criteria for personality and behaviour;

- however, in practice, methods differ depending on the type of job classification. In some firms the staff is considered as a whole and efforts are continuously made to upgrade people. In other firms, the workforce is divided into groups with specific skills depending on the sector or the branch in which the firm works - this leads to a dual management of manpower. Thus, according to statements made in the Rome colloquium in October 1986, the two French enterprises are trying to reconstruct their qualification pyramid by removing bi-polarization (Bull) or by maintaining a qualification potential in order to anticipate future needs (Mutuelles Unies). On the other hand, the English firm has its own "core" of staff, a group who spend their career in the firm and for whom needs-oriented investment in training is undertaken. People with a good potential for training are recruited to this "core". In addition to this there are staff on the periphery who are either less qualified or have qualifications which are quite common in the different sectors and who are, therefore, affected by movements on the external market.

The training schemes run by the firms are generally very costly (all the cases presented at the Rome colloquium, the cases presented in literature or in the course of meetings like Europrospective in Paris in 1987). However, as we have just seen, the underlying orientations can differ greatly and the impact on future qualifications could be highly diverse and even contradictory. The main options in training, and this applies to training for the NITs too, are presented in the following table.

Training for the NITs
The main options

Training objective / Target groups	Immediate	Anticipated
Staff categories directly affected by the NITs	from learning modes of operation →	
Broad spectrum of staff categories	↓	→ to knowing how to direct a work situation in evolution

There are great differences in the training given in the different firms, and this applies to all countries. S. Gensior establishes the same finding for Germany but remarks that, as a whole, the firms, with a few exceptions, continue to favour traditional forms of training.

S. Bevan and A. Rajan say that the English firms have the reputation of focusing attention on the staff and on training some time after the technical innovation or product. This is justifiable in many cases but in other cases the personnel policy is anticipatory and the technical change is planned.

The Spanish, Italian and French studies mainly deal with firms who are known for their investment in human resources.

What is important is that the "advances" confirmed by many studies in the different countries should follow the lines indicated in the table above. Three important concepts may be derived from the observed practices:

- the concept of controlling change,
- the concept of anticipatory human resource management,
- the work situation as the place and the moment in time of training.

Indeed, one of the main contributions of the last few years has been the fact that the different actors on this stage have become increasingly aware of the process of change and the necessity of guiding it.

Change is a long process which has to be prepared and guided in an anticipatory and evolutive manner. One approach which is being applied for this purpose is participative action. This has developed further, it has moved beyond the humanist proclamations and declarations of intent of the 1970s and now envisages the participation of the operator in the selection of hardware and the provision of sufficient training and information for him so as to avoid resistance and absenteeism, encourage motivation and protect qualification. A socio-economic rationality is the order of the day where the information contributed by the operator is considered to be enriching and exploitable, where acquisition of skills is considered to be a major investment for optimal exploitation of technical possibilities within the existing economic context.

This is the reason for the new weight attached to training and, in broader terms, to human resource management within the firms.

The developments of the last few years have also shown the importance of the work situation as the place and the moment in time for training. When the equipment or work organization or product are changed, training is mostly acquired through the daily operations, the routine work; formal training courses only teach some basic principles. This is one of the reasons which encouraged the development of the new jobs described in Chapter II (monitors, supervisors, coordinators).

Furthermore, in the course of restructuring, the firms often had to re-deploy and re-train a large part of their staff, if this re-training was not done externally. These cases show how important it is whether experience improves qualification or has a deteriorating effect. This is why one should look for training courses which really develop skills. The criteria applied to assess trainees and workers also change as a consequence. The term "potential" becomes a key word.

This trend which has just been described, cannot be generalized. At present it is a thrust undertaken by a few; will it act as a stimulus for others? Is it essential for economic success as its initiators proclaim? At the end of their international studies O. Bertrand and T. Noyelle state that, more than the technical heritage which is quite similar in

equivalent firms in the different countries, it will be the management of personnel which, in the very near future, will manifest the difference between the firms in the different countries. For R. Koch, the firms have the relative choice of substitution between technology, work organization, working conditions, training and continuing training; however, a minimum amount of investment in vocational training is necessary in order to achieve an optimal social and economic result (in this author's opinion training includes preparing people for participative action).

Conclusion

A new relationship between training and employment
The partners, the perspectives

The NITs increase the possibilities of work organization, at the same time, the firms are trying to find responses to a new economic environment.

In this economic confrontation the management of human resources appears to be an increasingly significant determinant. Training, in this context, should not be viewed only as a means of adaptation, but above all as a fundamental investment which will enable the firm to anticipate, innovate and react swiftly.

This framework shows that the problem of training generated by the NITs cannot be reduced to the deployment of a new tool. The very objectives and conditions of occupational activity have undergone a profound change.

Let us recall some of the essential aspects which must be taken into account:

- occupational activity is multi-dimensional. The technical activity (field of work and tools) is exercised in an environment which accentuates human relations (communication), makes it necessary to observe criteria such as

management, precision, quality (economic contribution), and calls for critical behaviour, suggestions and creativity (dynamic action). The vital factor is to learn how to cope with an evolving work situation;

- a re-definition and re-positioning of various jobs with important new roles to play, e.g. stimulation and support can be provided by these new jobs which will become true vectors of change (monitors, supervisors, coordinators, etc.) Although this does not fall within the scope of our study, we would like to mention the question of training for managers and, in general, for executive staff, who have to learn to guide the process of change; this involves the fine art of anticipating changes and managing human resources;

- the importance of everyday work as the place and the moment in time for training, as the means of developing skills or allowing them to deteriorate. This was seen very clearly in the last few years when it became necessary to learn to operate the NITs and master the new fields of application, or when internal or external re-training was required;

This fact invites us to view organizational options in terms of the repercussions on human potential. Careers must also be examined anew to identify their stimulus for the development of skills. Recruitment criteria tend to relate to possible areas of work rather than a specific job. Here, the importance of human resource management

techniques and the risks of a strong segmentation of the staff become evident, depending on whether the staff is viewed as a potential asset for the firm or not (or only regarded as a store of know-how).

- The rapidity of change in occupational activity has transformed the traditional relationship between initial training and work. As a result, the relations between the providers of training have also changed, the teachers from the educational system now tend to go to the firms to train themselves and to keep up with new developments.

The firms, compelled to adapt their staff, are now beginning to develop their own training schemes, which they partly view as remedies for the shortcomings of the educational system (Knapper et.al.). The role of training is generally becoming more essential and there are many experiments in several Member States of the EEC where an attempt is being made to establish a new complementarity between the different providers of training: the State, the firms, private organizations and the individuals themselves (Europrospective colloquium).

It is true that closer links between the different partners are necessary and are being progressively established, but care should be taken that each partner retains his independence and has a well defined role. There is considerable danger that training will be designed to serve economic profit alone,in the narrow sense of the term, and will assume a perspective whose dimensions are no longer relevant. The

learning processes must give due consideration to the time needed to learn by human beings (individual and collective), long-term investment in this field should not be neglected if dangerous economic and social consequences are to be prevented.

* *
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Summing up, we would like to draw attention to some essential points which should guide our work and our efforts in the coming years:

- extend the content of training by including the aspects of human relations, management and dynamic action in the context of a specific occupational activity; make substantial efforts to design teaching methods as these are as important as content;

- provide resources to attentively follow the development of occupational activity, taking into account the organizational options and the techniques of human resource management as essential factors. This implies considerable efforts in the field of methodology (research) and a structure which will enable the different partners (researchers, employers, employees, teachers) to work together;

- undertake a close follow-up of the new institutional relations being established between the different providers of training;

- promote experiments, particularly at local or regional level, which may contribute a great deal to new forms of collaboration, and allow sufficient time for reflection and stock-taking;

- provide the resources and the structures for a broad and rapid diffusion of the results.

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